Role-playing of Clinical Situations to Promote Critical Thinking

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My students are among the brightest, by their statistics, and they are willing to prove this repeatedly on standardized tests. The strategy of straight memorization has paid off well for them in the past. However, the choice to concentrate on jargon, as opposed to integration, is especially ineffective in a field like immunology. Terminology must be learned, but it does not reveal important functions of the immune system. Students must move past their compartmentalized view of the subject, and into a more critical-thinking holistic approach to the material and, horror of horrors, how it related to previous course work.

Clinical role-playing

In an attempt to provide students with experiences that enable them to integrate material, and invite them to become active participants, I introduced role-playing into my immunology class. This is a senior level course at Alma College with an enrollment of between 18 and 30 students, most of whom have strong medical interests. I divided the class into teams (3-5 students/team) which were carefully chosen to equalize the type and quality of thinkers on each team. I informed them that they were medical interns on an immunology rotation at a small city hospital. They were seeing patients in the hospital and emergency walk-ins. I would supply a case history, but they would need to puzzle out the problem by using direct patient questioning and by ordering medical tests of the sort we had discussed in class. They would work together as a group and could utilize any knowledge they possessed, except for the book. There were only two restrictions: all communications with the patient were to be written down so other groups could not eavesdrop and no outright guessing or jumping to conclusions was permitted. Their line of reasoning had to be clear to all members of the group and to me. My students readily agreed to participate, possibly envisioning that this would consume most of the lecture time, if nothing else.

The Scenario

I went out of the room and reappeared as the patient, Betty Miles, a forty year old woman. With my hand on my chest, I drew shallow noisy breaths and told them that I had been mowing hay when the tractor kicked up a swarm of bees from a crushed hive. “I’d been stung,” I said, “I didn’t know how many times. My cousin had died from a bee sting, but I wasn’t going to die, was I?” “No, no,” they assured me, as each group frantically wrote out questions. Outright guesses (such as pulmonary pneumonitis from moldy hay, an example from their textbook) came first and were tossed back without an answer. They saw that I went from group to group in order; a useless question would waste their place in line. Results for the clinical tests they ordered came in the form of graphs and tables which required analysis. Asking for a very costly or time-consuming specialized test on sheer speculation also caused a delay, as I told them they had not yet gotten the results.

After a few moments of panic at the new situation, the students settled down, consulted as a group and asked more focussed questions. “Are you allergic to bee stings?” “Well, I don’t know, I never have been before, but these things can come over you suddenly, I heard. I don’t want to die.” “So you’ve been stung before?” “Oh, yes. I knew I better drive over here right away.” “Drive? You drove here?” “Of course I did, I live way out in the country, you know!” They concluded that a 30 minute drive ruled out a bee sting allergy. Adroit questioning of the patient determined that the breathlessness came from the walk up the stairs; the patient had used the back entrance by mistake. Further questioning revealed that she didn’t have a regular doctor, she wasn’t sick very often, and well, her family just got over what ailed ‘em (another clue), like that real bad sore throat she had two winters ago . . . it went away without the doctor (major clue). It became apparent that she had the same kind of
breathlessness whenever she exerted herself. She admitted that she used to jog every morning, but had given it up about a year ago; she guessed she was getting old. Listening to her heart (suggested by a student from the cardiac rehabilitation class), they heard faint signs of a cardiac valve abnormality. A test for anti-streptococcal antibodies revealed that a high titer was present in her blood. Group by group, the students concluded that the untreated sore throat, which might have been a streptococcal infection, had resulted in the production of antibodies which defeated the sore throat, but eventually produced a well-known cross reaction with heart valve tissue (rheumatic fever). Cardiac insufficiency under stress conditions resulted in the breathlessness they observed.

Debriefing

What did the students gain from this exercise? They were extremely pleased with themselves when they solved this problem and wrote extensive comments to several questions I supplied at the conclusion of the exercise. They hadn’t realized how hard it would be to integrate the material that they had memorized, nor how rewarding it would be to apply it, they said. Students seemed to appreciate that memorization had a purpose, a connotation within the class, but it was insufficient for true understanding. Reading data in the form of tables or graphs was difficult; they had more trouble than they had anticipated in figuring out what the control values meant, and if the data were significant. By their own admission, charting a logical progression was problematic, but the students all agreed it was extremely worthwhile. Those students with medical careers in mind were surprised to see how much of their success might rest on what the patient hadn’t told them. When asked about group dynamics, they readily admitted that the best answers had not always come from the “best” students, and acknowledged the contribution of all students to success. This conclusion led to a brief discussion of the role of cooperation in science. They left class still replaying the experience and didn’t seem to mind that the application had been a “game.”

Risks and Rewards

This exercise required an entire lecture period, in which I could have covered half a chapter of information. I risked looking extremely foolish in front of an often critical audience. The questions came rapid-fire, often with no discernable logic, which forced me to discriminate between valid requests for information and guess work. I carefully monitored the information I gave out, slowing the best group by asking very pointed questions, while dropping hints to the slowest group, so that groups progressed at somewhat equal rates. I had to redirect the energy of impatient or frustrated students and divert their anger, both from myself and from each other.

What did we gain? By their own acknowledgement, many students began to view the lecture and the basic information presented therein as tools with a purpose. We discussed explanation, argument and evaluation as critical thinking skills which took time to learn, but that could be improved. They began to ask questions that went beyond basic levels; such questions were increasingly rewarding to hear, but correspondingly more difficult to answer. I turned the very difficult questions back to the students with the hope of generating an open discussion format, an approach which I still need to refine. I have already experimented with case studies during exams, in a guided-speculation format. I would like to expand the number of experiences available to the students each term, possibly by creating a charade-like situation where the students themselves are the patients in small group situations. I am also interested in transferring this approach to other classes.

How to prepare for role-playing

This technique could be applied to a number of biological areas, especially where medical implications are involved, such as physiology, genetics, or microbiology. Alternatively, a real scientist could be role-played (Randak, 1990), either from the past, or the present. The format could be a case study in a medically related area such as physiology or biochemistry (Davis, 1993; Hunt and McMurray, 1993; Kaleta et al., 1993), an interview, a news conference over a new discovery (a major advance in AIDS research), or a competitive research situation between several teams of scientists all vying to solve the same research problem. It is easier to start with a few steps and gradually build to a full hour-long exercise.

The actual scenario, in the case of a patient simulation, must have a certain degree of complexity, yet still be accessible to the relatively naive student. Authentic case studies, such as
those found in the New England Journal of Medicine, are usually far too involved and require too much specialized knowledge to be of much use, although they may provide ideas. Additional idea sources include case studies in biochemistry (Montgomery et al., 1990), as well as immunology (Kuby, 1994; Roitt et al., 1994) and clinical pathology texts (Standler and Klionsky, 1992). I try to select a problem with at least two levels, and then choose a patient who becomes an additional part of the puzzle. A wealthy socialite visiting a clinic in the poor part of town is there for a reason (a recurring and embarrassing parasitic infection) and the freighter captain's allergy may be related to his cargo. As far as simulating the patients, I try for accents and emotional overtones, but have not tried to dress the part. I try to stay in "character" as much as possible, but if the students veer off-track I may drop the role and redirect their questions.

Once the problem has been identified, I create the data that students are most likely to require. Although I have some blank diagnostic test forms, I often create my own graphs to meet specific situations. I try not to overwhelm students with extraneous detail, but I include more than just the clue they need. Since I produce the graphs and tables on the computer, it is a simple matter to adjust the numbers to get the effect I desire. I try to stay within realistic values whenever possible.

Running the scenario is the most rewarding and difficult part of the entire enterprise. It is remarkable how quickly students can get sidetracked, and what outlandish suggestions they make. Monitoring progress and watching group interactions can be very revealing in terms of assessing intellectual maturity. I do not attempt to grade these exercises; instead I award points for participation. This seems to bother only the most competitive students; they feel they have somehow been cheated.

**Summation**

The addition of patient simulations to my immunology class has enriched the atmosphere of the class and student appreciation for the complexity of the subject. In addition, they have begun to appreciate the levels of learning beyond memorization. I would like to hear about other instances of simulations or role-playing in the classroom, no matter what the subject area. I am especially interested in experiences for entry level students.

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**Literature Cited**


